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ABSTRACT

The aim of "Bridging the Technological Gap" (BTG), a federally funded demonstration project, is to use microcomputer technology in the rehabilitation of the psychiatrically disabled. Through the use of a custom designed microcomputer software package, clients receive remediation in areas of specific cognitive and behavioral deficits. The project will create software applications focusing on increasing flexibility, impulse control, attention and concentration, mastery competence, and problem solving ability. Additionally, the project will train clients in fields requiring microcomputer skills. A needs assessment which examined existing software used in rehabilitation and/or education and identified the cognitive/behavioral deficits within a psychiatrically disabled population is described. A description of the evaluation plan for the BTG program concludes the paper. (CL)

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BRIDGING THE TECHNOLOGICAL GAP

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ABSTRACT

The policy of deinstitutionalization of the mentally ill coupled with the dawning of the age of technology has exacerbated the historical difficulties faced by vocational rehabilitation programs in successfully providing employment for their clients. The traditional gaps between the functioning level of the client and the demands of the mainstream employer have, consequently, widened. The "Bridging the Technological Gap" Project (BTG), a three year demonstration project funded by the U.S. Department of Education, Rehabilitation Services Administration, aims to use microcomputer technology in the rehabilitation of the psychiatrically disabled. Through the use of a custom designed microcomputer software package, clients receive remediation in areas of specific cognitive deficits. The addition of this approach to traditional rehabilitation efforts is intended to increase the employability of the mentally ill.

The Crisis in Vocational Rehabilitation for the Psychiatrically Disabled

For the past several years there have been significant advances in the field of computer technology, particularly with the introduction of the microcomputer. The result of these advances has been the creation of a shift in the types of employment opportunities available in post-industrial nations, such as the United States. While jobs were once plentiful in unskilled and semiskilled labor-intensive industrial work sites, changing conditions have decreased these opportunities while employment openings in technological and service oriented fields have increased (New York Times 1983; Labor Market Information Network, 1982).

This shift in job opportunities has had a profound effect on the psychiatrically disabled. Often the work experiences they have received in vocational training programs and sheltered workshops have been geared to an industrial/manufacturing environment. Once it was sufficient to learn repetitive industrial assembly work, manual filing or typing; now, the new worker demands require the ability to operate a microcomputer, perform word processing, data entry, and/or automated record and bookkeeping. In addition, employers are increasingly demanding that personnel be flexible and adaptable, use independent judgement and be ready to continue learning during the course of employment. (National Institute of Handicapped Research, Dept. of HEW, 1976); Griffiths, 1974; Rehabilitation Services Administration, 1979).

The impact of these labor market trends has been hightened by the

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movement of persons with chronic disabilities into vocational rehabilitation as a result of public deinstitutionalization policies. These individuals have been characterized as apathetic, dependent, rigid, lacking in initiative, and tending to avoid new experiences. When considered in the context of the current labor market trends, these behaviors, are antithetical to those being sought by employers. Thus, attempts to increase the employability of these individuals should go beyond the updating of skill training and address these basic functional deficits.

Bridging the Technological Gap

Altro, in response to this need, proposes to improve the basic cognitive functions currently in demand in the labor market, but deficient in the mentally ill. The primary tool to be used in this effort is the computer. The introduction of the microcomputer into the treatment regimen represents an innovative attempt to integrate a powerful new technology into the field of psychiatric rehabilitation. The microcomputer is ideally suited in many ways to the task. It has been called "user friendly" because it can be easily accessed and tailored to the needs of individual users. In addition, micros can be programmed to not hurry the user by moving at the users work pace. It can also provide immediate feedback in a non-judgmental, stimulating manner. The attributes of this technology may well extend the powers of the individual interacting with it, particularly in the areas of intellect, ego function and cognition. (Chartrand and Williams, 1982); Imprint Software, 1982; Anastasin and Wang, 1981; Robleyar, 1981).

Altro's "BTG" project tests this premise by remediating basic cognitive and behavioral deficits through the use of the microcomputer and custom design software. The project will test the hypothesis that specific attention to these deficits and traditional rehabilitation will not only improve functioning in the targeted areas but will also enhance employability.

Specifically, the project will:

1. Create microcomputer software-applications that will focus on building flexibility, impulse control, attention and concentration, mastery competence, and problem solving ability.
2. Provide vocational training in fields requiring microcomputer skill, such as data entry, word processing, and bookkeeping.

The efficacy of this new approach will be determined via a rigorous evaluation effort that assesses the impact of the cognitive enhancement package and skills training individually and as used together.

Project Progress

As the project approaches the end of its first year, software packages have been developed and are currently being pretested for "fine-tuning." The project hardware, ten Apple Macintosh microcomputers, have been purchased. These machine are described as third generation computers. They have simplified user interaction by making use of simplified command structures (Mace, 1984).

Needs Assessment

Needs Assessment took a two-pronged approach; a review of existing software in use in rehabilitation and/or education, and an in depth analysis of the cognitive/behavior deficits within the Altro population.

Altro surveyed the progress made over the past several years in the use of microcomputers as an interactive learning device with learning and physically disabled children in the field of education. In addition, the use of microcomputers as a rehabilitative tool with adults who have lost cognitive functioning

as a result of head injury was examined. Microcomputer software available for these populations are as diverse as the population. However, one of the common concepts in all of these applications is that microcomputer software enables individuals to initiate activities that can change an individual's environment, and in turn, the individual is effected by that environment. This principle was to be central to the software development. (Papert, 1975; Papert, 1980; Gable, 1980; Weir, 1982; Hannaford, 1981; Weizenbaum, 1976; Gianutsos, 1982).

Concurrently, a pilot study was conducted to identify the specific ego/cognitive areas in which Altro clients, with their often severe/chronic psychiatric disabilities, have problems. The Bellak Ego Function Scale was used as a primary tool for targeting the areas of greatest deficit among Altro clients. Ego Functioning as identified through the Bellak Scale has been found to be predictive of employability among the psychiatrically disabled. Measures were also obtained from WAIS scores and from the behavioral observations and evaluation of Altro's clinical and workshop stuff. (Bellak, Hurrich & Geidman, 1973; Ciaridiello and Sobkowski, 1983).

Cognitive deficits among the psychiatrically disabled were identified using the findings of the pilot. The areas identified by the Bellak Scale that showed the greatest functional impairment, and appeared most amenable to remediation through use of the microcomputer, were Adaptive Regression in the Service of the Ego (ARISE), Drive Regulation and Control, and Mastery Competency. Staff ratings and the Picture Completion subscore on the WAIS indicated that attention, concentration and memory were other deficits in need of remediation.

The existing software was examined in relation to identified needs. It became apparent that no available program would meet the particular needs of Altro clients. Therefore, it was decided that custom software should be developed using the principles of existing materials. Four software modules were developed. One corresponded to each of the deficit areas identified above. This series of software modules is called COGITO.

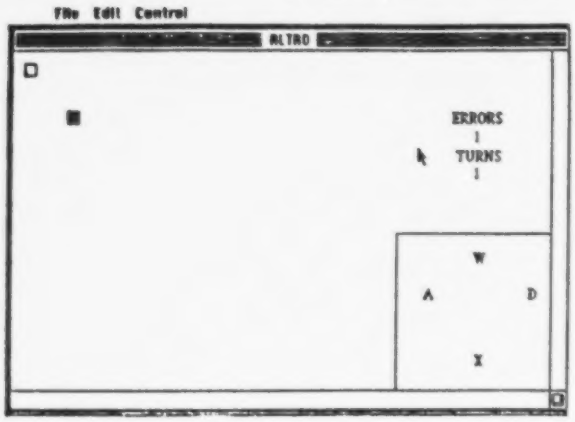
Software Development

The first module to be developed for COGITO was designed for ARISE. ARISE has been defined as the "capacity to relinguish well-formed secondary processes to allow for the creative utilization of more primative modes of thinking." It is associated with the functions of flexibility and adaptation. The software module contains training tasks that require the user to switch response sets. It also requires graduated adaptations to different response sets (Norello, 1974, p. 52).

The first component of the ARISE module provides a good example of COGITO software. It requires the user to move one box over a second box using special keys on the keyboard (such as a sequence of S,F,E,X, that moves the box up and down and left and right). A legend in the monitor corner indicates what movement each key provides. At set intervals the legend changes requiring the player to switch to a different set of letters to move the box. When the client does not switch to the new keys, an error is recorded. (See Figure 1).

The second domain, Drive Regulation and Control or Impulse Control is described as "the capacity to appropriately control the expression of drive derivitives: the degree to which aroused drives affect behavior." The module for this area contains two components. First the user must respond repeatedly to a stimuli and then inhibit that response relative to a cue. The second focuses on inhibiting a user's response and then responding appropriately to a cue. (Norello, 1974, p. 51).

Figure 1



The third area targeted for intervention, Mastery Competence, is "capacity for successful planning and mastery over environment." The user must learn to adapt to the demands of a computer constructed environment. Mastery is related to the client's ability to follow directions, manage resources, and attain goals. (Norello, 1974, p. 55)

The final module was developed for Attention, Concentration and Memory. This area is defined for this project, as the ability to discriminate between similar cues, remain on task, increase the amount of time on task and resist fatigue on task. This module requires the user to correctly discriminate pairs of pictures. This becomes more difficult in a second version when the user has to discriminate between pairs of pictures with a visual and/or auditory distractor present and with varying amounts of response time allowed. In a third version, the user is required to match picture pairs distributed at random in a four by four array from memory. This version is made more difficult by again adding an auditory distractor.

Altro is presently in the process of pilot testing and refining the software for the four described domains. In addition, it is investigating other areas of possible intervention with software applications.

Program Evaluation

The evaluation of the Bridging the Technological Gap program will be conducted under the auspices of the Altro Institute for Rehabilitation Studies, an autonomous arm of the agency that conducts educational, research, and evaluation projects.

The primary purpose of the evaluation is to test the hypothesis that the critical factor in the rehabilitation of severely disabled mentally ill persons is the remediation of basic cognitive and behavioral deficits. The assumption is that specific attention to these deficits together with traditional rehabilitation will not only improve functioning in these specific areas but will also enhance employability. The secondary hypothesis to be tested is that in cognitive/behavioral remediation will be most effective together with microcomputer skills training.

The specific experimental hypotheses are as follows:

1. The computer remediation program using "COGITO" will significantly improve: Flexibility/adaptability, impulse control, mastery competence and memory, attention, and concentration.
2. Clients participating in the computer remediation program using "COGITO" will significantly improve vocational functioning; specifically work appropriate behavior, productivity, and placement into competitive employment.
3. The computer remediation program using "COGITO" will be effective when used in conjunction with a microcomputer skills training program.

Subjects

The Project population will consist of Altro Health & Rehabilitation clients meeting the following criteria:

1. Minimum of an 8th grade reading level;

2. Minimum WAIS Full Scale IQ of 85;
3. Adequate finger dexterity to operate a computer keyboard;
4. Willingness to use the microcomputer.

Sample - Eligible clients will be randomly assigned to one of the following four experimental groups:

	COGITO	MICRO TRAINING	TRADITIONAL REHABILITATION
GROUP A	X	X	X
GROUP B		X	X
GROUP C	X		X
GROUP D			X

Each group will have 10 subjects. Subjects are projected to remain in the program for a maximum of 9 months.

Method

All subjects will be given the project test battery prior to entry into the program. The test will be repeated after four and one half months and after nine months. If a subject completes the program prior to nine month, post-test measures will be taken at that point. The length of stay will be accounted for in the analysis. A three month period following the training cycle will be allowed for placement into employment.

Instrumentation

Measures of program effectiveness will be made at three levels. Level I will measure performance on computer tasks. This will have built-in scoring mechanisms. Level II will use validated psychometric instruments that correspond directly to each of the program modules to test the generalization of acquired skills. Level III will test generalization to broader areas of functioning including work related behavior, productivity, program attendance, self esteem, and symptomatology encapsulation.

Analysis

Each hypothesis will be tested via a multiple analysis of variance that assesses the significance of change over the course of the project. The interrelationship between the levels of measurement will be established via an analysis of covariance.

Client training in the "BTG" Project begins November 15, 1984. For further information contact:

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